Growing Catfish in Brackish-Water Ponds

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A NEW TYPE of farming is growing in Louisiana—catfish farming. Growing catfish in ponds has caught on for several reasons: many catfish farmers are already clearing $200 and more per acre per year, ready markets exist for pond-fed catfish, and there are no federal restrictions on the number of catfish raised.

With an increasing interest in catfish culture, some fish farmers are looking to coastal regions of Louisiana for land to build ponds. Much of this land is marsh and contains brackish water (fresh water and salt water mixed). Nevertheless, it is less expensive than improved farm land, and being far south it affords a longer growing season. If fresh-water catfish can be grown in brackish-water ponds, then a whole new industry awaits Louisiana.

Heretofore, fish culturists believed that fresh-water catfish would not grow in salinities of over 1.5 parts per thousand (ppt), but no conclusive research had been conducted. The LSU Agricultural Experiment Station, in cooperation with the Louisiana Wild Life and Fisheries Commission, conducted an experiment in 18 ponds over the past two years to determine if fresh-water catfish could be cultured in brackish ponds. A laboratory study was also conducted to determine the salinity tolerance of fresh-water catfish.

Pond Studies

Fingerlings of blue, channel, and white catfish were stocked in brackish ponds at Rockefeller Wildlife Refuge to determine growth, survival, and food conversion.

In the spring of 1967, nine ponds were stocked with catfish. Each species was stocked separately in three ponds at a rate of 2,000 per acre. All fish stocked were originally obtained from fresh water. Fish in each pond were fed approximately 3 per cent of their body weight daily, and were seined every two weeks to check growth and to adjust feeding rates. In the winter, all ponds were drained and the fish were counted and weighed.

In 1968, the same experiment was conducted, but with the stocking rate increased to 2,500 per acre. Salinity in ponds during the two-year experiment ran from a low of 1.8 ppt to a high of 11.2 ppt. Normally the salinity ranged from 3 to 7 ppt. By comparison, salinity of ocean water is usually 30 to 32 ppt.

Channel catfish grew best both years; white catfish outgrew blue catfish. Top production was obtained in a pond containing channel catfish. This pond produced almost one ton of fish per acre. Survival was 93.2 per cent and food conversion was 2.1. Data for the 1968 experiment are presented in Table 1. Results in 1967 and 1968 agreed very closely. A difference, however, was found in the average size of fish harvested, which reflected the two stocking rates. Fish stocked at a rate of 2,000 per acre grew slightly larger than those stocked at a rate of 2,500 per acre.

Taste Test Conducted

Some of the fish were eaten after termination of the study, since it was feared that they might possess a marshy taste. The taste was rated excellent, with no objectional flavor or odor noted.

Several problems arose during the study, but none would prohibit catfish culture in the marsh. During both years, predation by a family of otters was considerable. Otters are known to range over a vast territory, and evidently the ponds offered an easy source of food. Alligators also entered the

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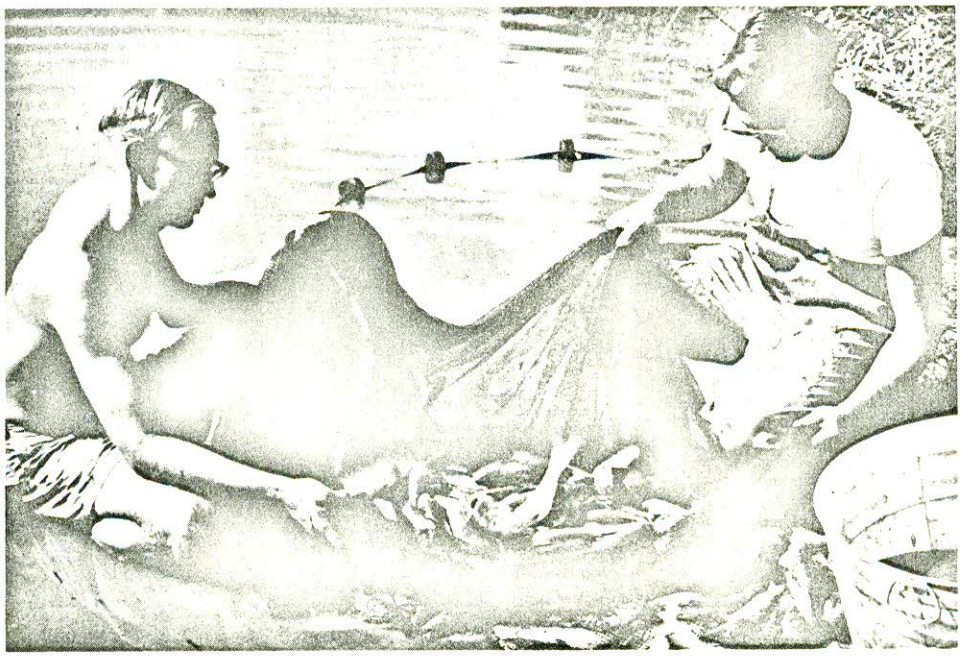

Catfish were sampled every two weeks to check growth and to adjust feeding rates.

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ponds and ate catfish, but did not cause appreciable losses.

Oxygen depletion, particularly on cloudy or rainy days, also presented a threat to the experiment. Oxygen was increased in the ponds by recirculating the water with pumps, and by addition of water already saturated with oxygen. Oxygen depletion is not unique to marsh ponds but also occurs in fresh-water ponds.

Construction of the ponds also posed a problem. To begin with, the soil had to be moved with a floating dragline, or with a dragline on mats, since much of it was in a semi-fluid state and would not support a bulldozer. Rather than being dug out, the ponds were built above the marsh floor to avoid breaking the surface crust. This was done by digging a reservoir canal and using the spoil to construct pond levees. After the levees were completed they had to settle and dry for several months, and allowances had to be made for shrinkage, which was as much as 60 per cent. Since marsh level is only slightly above mean sea level, gravity drainage of the ponds was not possible.

Laboratory Studies

Laboratory tests were conducted in aquaria at LSU to determine the highest salinities that fresh-water catfish could tolerate. Tests were conducted with eggs, fry, fingerlings, and one-year-old fish.

Eggs of channel catfish, spawned originally in fresh water, developed normally in salinities up to 14 ppt, but died when they were hatched at salinities above 9 ppt. When eggs only a few hours old were placed in brackish water, survival was low due to the permeability of the egg membrane to salt water. Once eggs "water-hardened," tolerance to salinity increased.

Tests with channel catfish indicated that fry and small fingerlings would grow in salinities of up to 8 or 9 ppt. However, older fish grew in salinities up to 11 ppt. Fish which were given a period of acclimation to brackish water grew in salinities of up to 12 ppt. Blue catfish and white catfish could tolerate salinities of about 1 ppt and 2 ppt greater than channel catfish, respectively. All three species could tolerate salinities slightly higher than these for a few days; however, if the salinities increased, fish lost weight and eventually died.

It was concluded that the upper limits of salinity tolerance were 11 ppt for channel catfish, 12 ppt for blue catfish, and 13 ppt for white catfish. Production of catfish should not be attempted if salinity exceeds these levels.

Within the limits outlined above, catfish grown in brackish water had rates of growth, survival, and food conversion similar to those of catfish grown in fresh water.

Fingerling catfish can be stocked directly from fresh water into brackish water. However, if fingerlings are to be placed in ponds with high salinities (around 11 ppt) they should first be acclimated to lower salinities for several weeks so that their systems can adjust.

Control of 'White Spot Disease'

Ichthyophthirius multifilis, commonly called "Ich" or "white spot disease," is the most dreaded parasite of fresh-water catfishes. A ciliated protozoan, Ich can virtually wipe out a population of catfish in a matter of days.

In laboratory tests, this parasite was completely controlled in salinities as low as 1 ppt when fish were held five days or longer. Control fish, held in fresh water, were killed by the parasite. These results were not too surprising, because a dip in 3 per cent salt solution is one of the oldest treatments for parasites known to fish culturists. Although no problems were encountered with Ich or other parasites in pond studies, it is possible that parasitic species not yet described may pose future problems.

TABLE 1.—Growth and Survival Data for Blue, Channel, and White Catfish Grown in 0.1-Acre Brackish-Water Ponds, Rockefeller Wildlife Refuge

	Blue catfish				Channel catfish				White catfish			
Pond number	B-13	B-14	B-15	Avg.	B-8	B-9	B-11	Avg.	B-7	B-10	B-12	Avg.
Number stocked	250	250	250	250	250	250	250	250	250	250	250	250
Weight stocked (lbs.)	10.3	9.2	13.0	10.8	6.9	7.1	7.9	7.3	9.1	9.0	9.0	9.0
Average size (lbs.)	0.05	0.05	0.07	0.06	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.05
Number recovered	0	188	161	174	233	233	218	228	231	232	183	215
Survival per cent	0	75.2	64.4	69.6	93.2	93.2	87.2	91.2	92.4	92.8	73.2	86.0
Weight recovered (lbs.)	0	126.3	97.9	112.2	196.0	175.8	170.7	180.8	171.8	163.8	117.8	151.1
Average size (lbs.)	0	0.67	0.61	0.64	0.84	0.75	0.78	0.79	0.74	0.71	0.64	0.70
Pounds feed/lb. gain	0	3.4	4.7	4.0	2.1	2.4	2.5	2.3	2.5	2.6	3.7	2.9

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